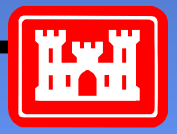
Airborne Laser II

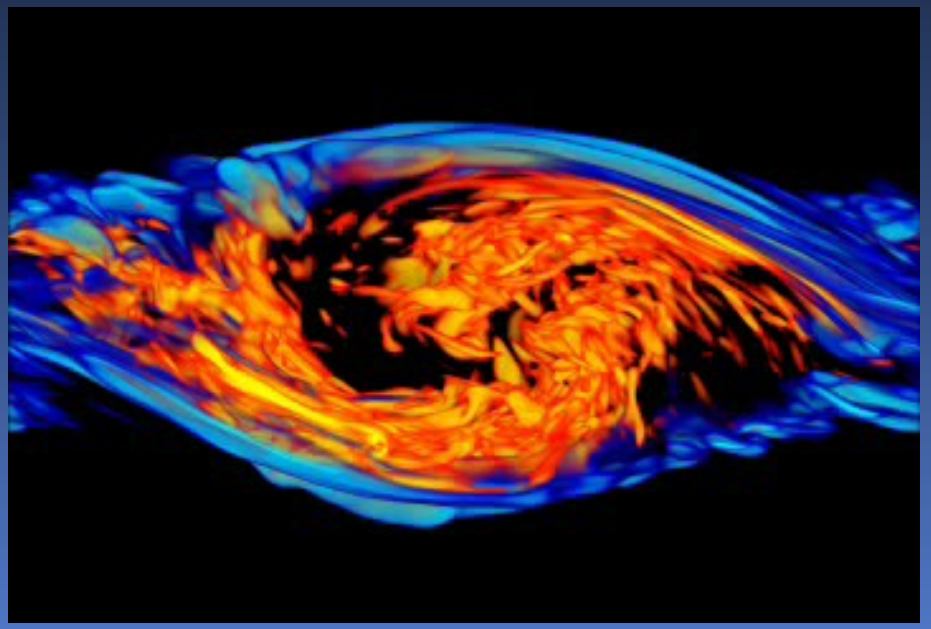
Joe Werne
Chris Meyer
Melissa Davis
Colorado Research Associates
(CoRA)

Paul Adams
ERDC MSRC



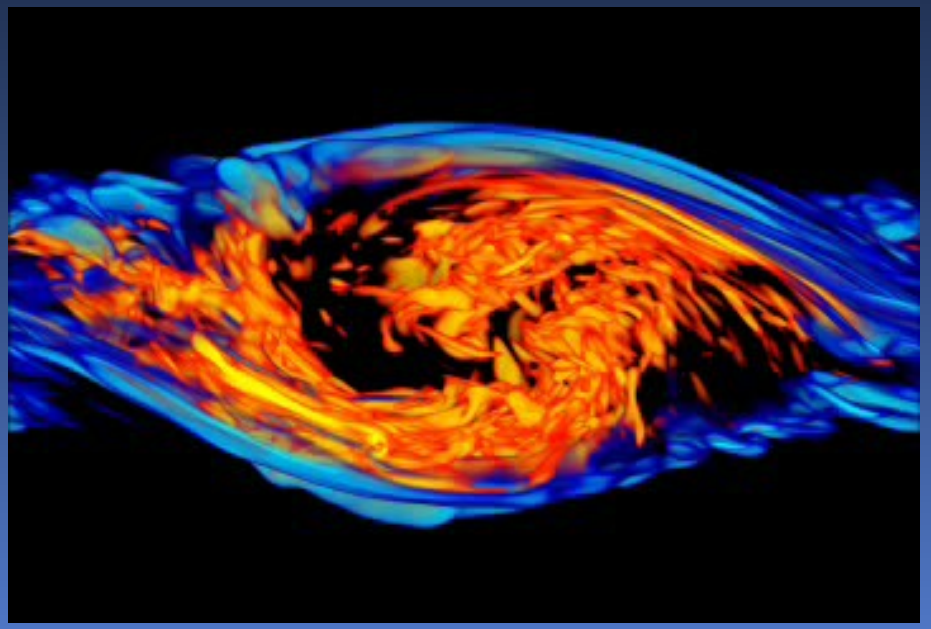
Airborne Laser

- Effect of atmospheric turbulence on a laser
- Spectral solver
- Each data set was 2.8 GB in size
- Thousands of data sets
- 4 TB total scientific data



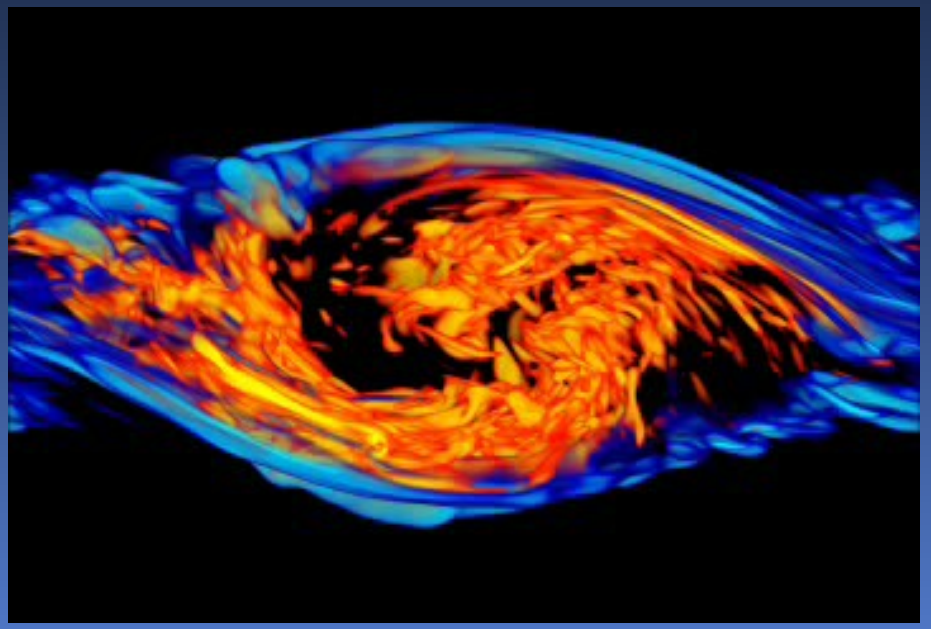
Airborne Laser

- Problems
  - Where to store 4 TB of data?
  - How to transfer the data over the network?
  - Exceeds capabilities of visualization hardware



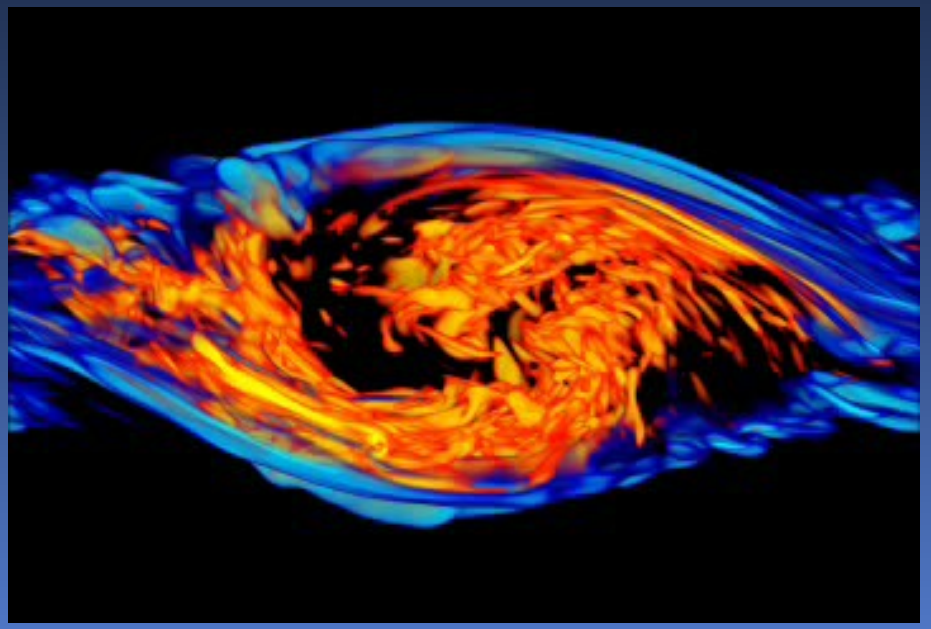
Airborne Laser

- Solution
  - Look at subset of the data
  - Byte-scaled the data
  - Used custom visualization tool, OGLE, developed by Dr. Mike Gourlay (CoRA)



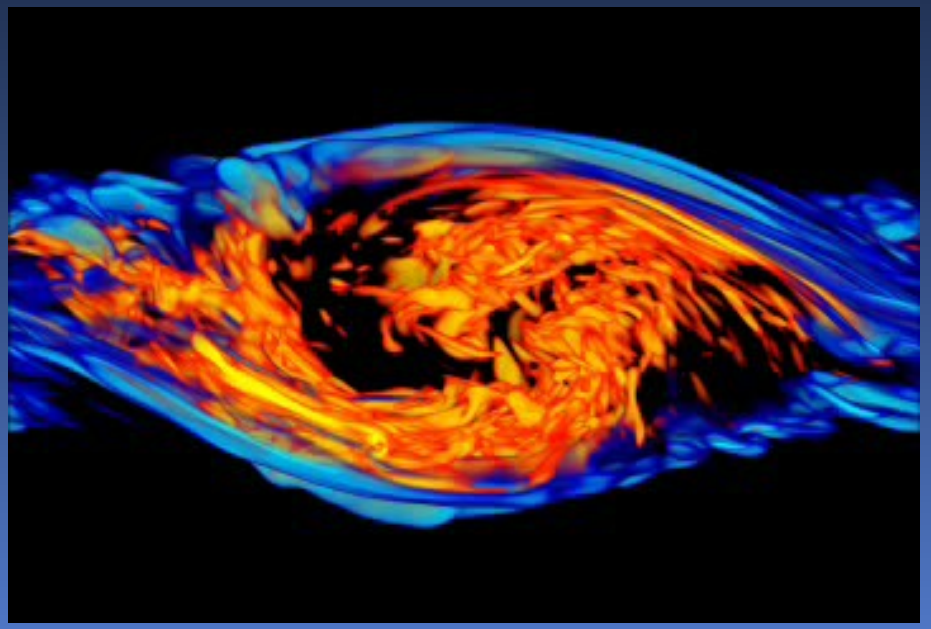
Airborne Laser

- Byte-scale benefits
  - Floating-point data were converted to integer values between 0-255
  - Reduced size of data by a factor of four



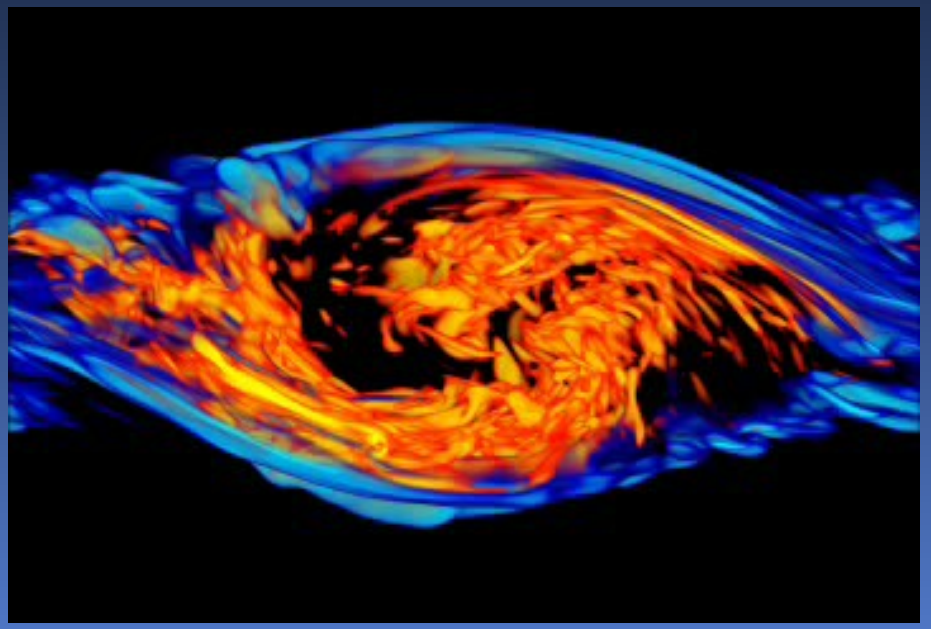
Airborne Laser

- Byte-scale problems
  - Loss in quality of data
  - Required judicious use of the technique to avoid losing features of interest



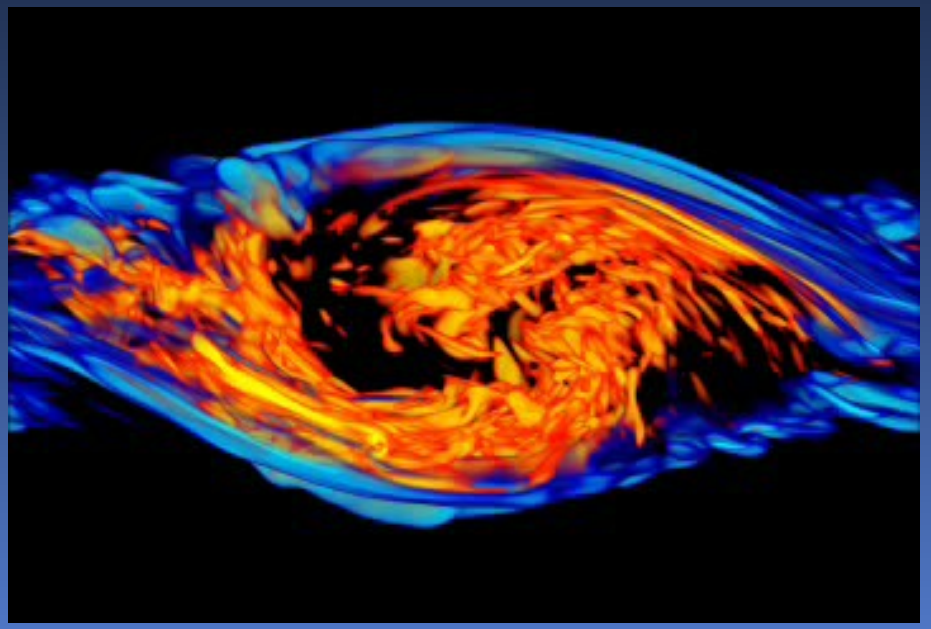
Airborne Laser

- In 2001, the ERDC SVC provided man hours and resources to visualize the data.
- In 2002, the ERDC SVC provided the resources only for the visualization.
- CoRA performed remote visualization.
- Technology Transfer



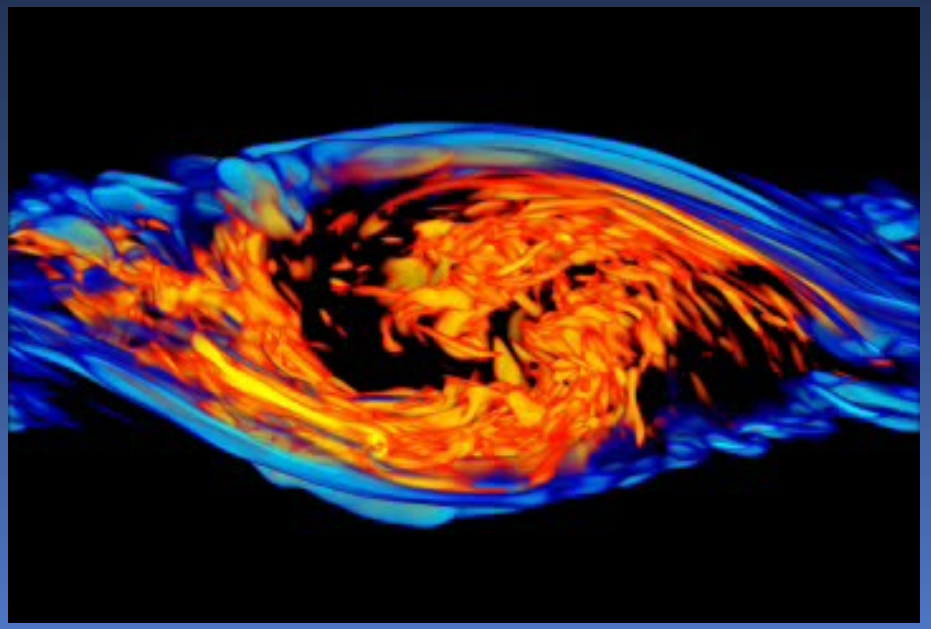
Airborne Laser

- Remote visualization
  - Used custom visualization tool, OGLE, developed by Dr. Mike Gourlay
  - No off-screen rendering capability, yet.



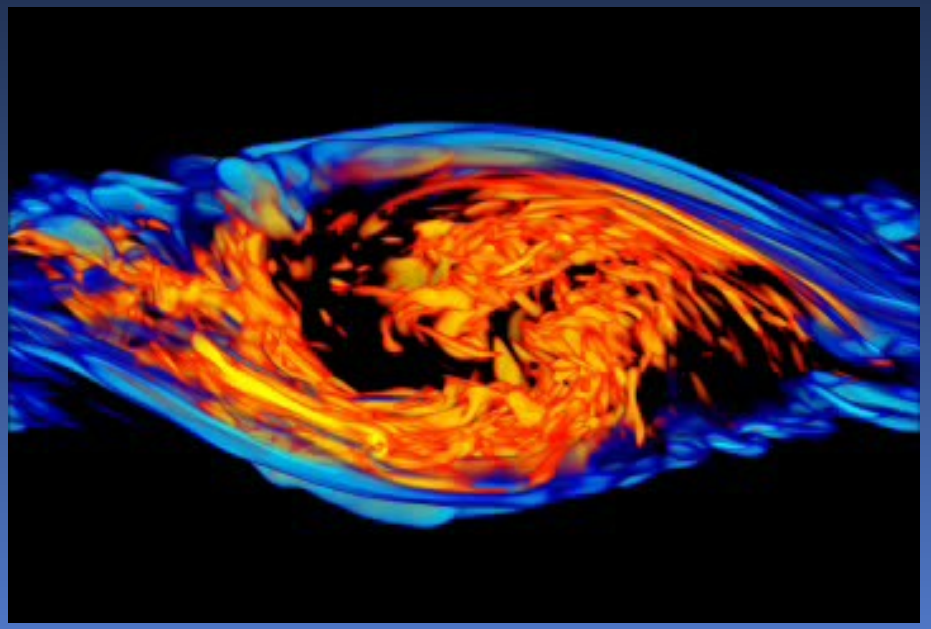
Airborne Laser

- Remote visualization
  - Used on-screen rendering at ERDC SVC
  - Ran on SGI Onyx2
  - 3 InfiniteReality2 graphics pipes
  - 400 MHz CPU



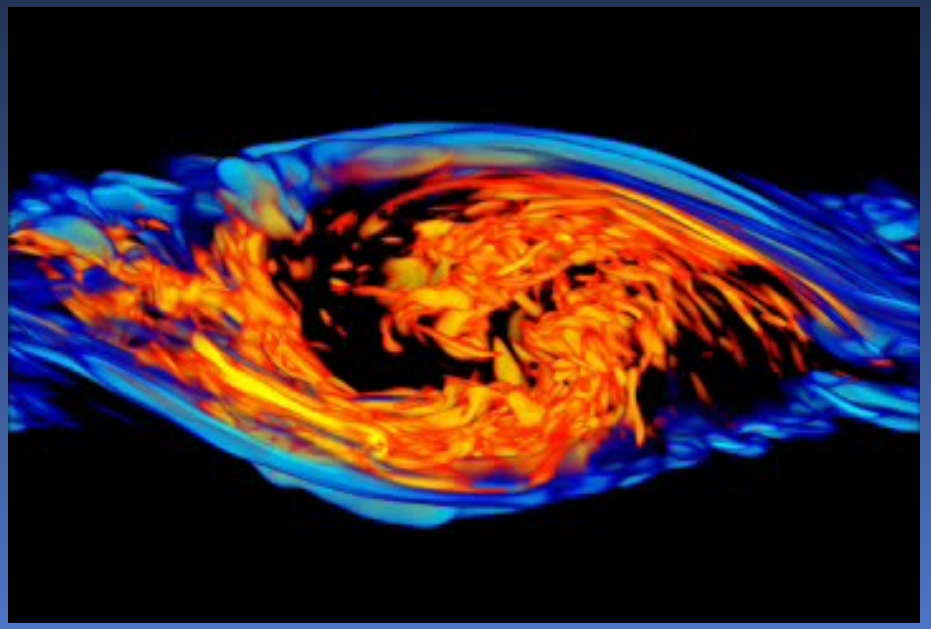
Airborne Laser

- Remote visualization
  - Required staff to log in for CoRA to open window on the screen
  - Security issues
  - 3rd graphics pipe dedicated to process with no monitor, keyboard, or mouse attached



Airborne Laser

- Alternate remote visualization
  - OpenGL Vizserver
  - SGI COTS product
  - Kerberos aware



Airborne Laser

- Conceptual visualization
  - Used to explain the possible future use of the system

Airborne Laser

- Visualization overlayed onto conceptual visualization
  - Used to explain the problem being studied
  - What is a Kelvin-Helmholtz vortex?
  - How does it affect the laser beam?